TOP SECRET

TC3-8979-64

30 October 1964

Copy 6

MEMORANDUM FOR: Assistant Deputy Director for Intelligence (Management)

THROUGH: Executive Director, NPIC

SUBJECT: Initial NPIC Quarterly Report to Project 375.

1. To establish the context for this and subsequent NPIC Quarterly Reports to Project 375 it is necessary to consider certain historical aspects of the development of automated information processing techniques at NPIC. The original concept of project HEADTOMAT envisaged using the Minicard System as a mechanism for storage and dissemination of imagery collected by the U-2 system. With the Minicard equipment on hand it was natural that it should also be applied to the storage and retrieval of document images to provide collateral support to the photo analyst. To supply additional summary target-oriented background information a system was evolved wherein an "encyclopedia" was maintained in punched-card form and reproduced prior to the start of first-phase exploitation for any mission. From this came the present procedures of supplying "Target Briefs" to the PI's for each mission, and the partial mechanization of first and second phase report production with automatic incorporation of the substance of these reports back into the Target Brief file. Begun on conventional tabulating equipment, this system was eventually transferred onto two IBM 1401 and together with the Minicard establishment constituted the automatic data processing operation of the Data Management Division and later the Collateral Support Division.

2. The Technical Intelligence Division's contribution to NPIC's ADP capability began with its requisition of the Agency's first computer for use in the various computational procedures of analytical photogrammetry necessary to meet analyst requirements for derivation of metrical information from photography. To improve the response time of the system to these requirements the concept of dispersed photo-measurement equipment on-line with a common computer was developed. The actual implementation of this system has proceeded with the acquisition of the Univac 490 as the computational element for the system. The criteria on which this selection was based were derived from postulated peak loading requirements as are the criteria used in design of any "real-time" system. One consequence of designing for peak loading is that total central processor time normally required for the so-called "real-time" application is only a small percentage of the total available. In this particular instance a substantial amount of time is required for executing batch programs that support the "real-time" system but well over 50 percent of total main frame time is available for other purposes (it should be emphasized that this time is assembled out of increments ranging in size from milliseconds to several minutes). As the

TOP SECRET

SUBJECT: Initial NPIC Quarterly Report to Project 375

Photo-Measurement System moved toward realization it became more and more deeply involved in problems arising in the creation and manipulation of large data files.

3. The Univac 490's file manipulation capability, coupled with a central processor with time available for multiple processing, and the lightly loaded printer offered an obvious solution to the overload on the 1401 that resulted from the increasing size of the Target Brief file and higher frequency of success in orbital collection efforts. Looking further ahead, the existence of an extensive system for intra-Center communication with the U-490 central processor offered an interesting vehicle for experimentation with various approaches to "on-line" information retrieval that might greatly reduce the amount of Target Brief printing associated with each collection effort. These considerations dictated a centralized approach to the use of such equipments in support of NPIC's photo-exploitation activities. On 4 May 1964 the Information Processing Division was established in NPIC by merger of the personnel and equipments of the two groups previously mentioned.

4. Although formally established at an earlier date, the Information Processing Division did not begin to function as a unified organization until the first weeks of July when the systems and programming groups from each of the original Divisions were physically moved together in a new location. As soon as physical renovation of the U-490 area is accomplished the IBM 1401 will be moved there from its present location, thus consolidating computer operations and facilitating assignment of jobs on the basis of equipment capability rather than organizational responsibility. The Minicard facility will remain in its present location. An interconnection with the central computer site, which could be accomplished by use of communication techniques over the secure lines existing for the Photo-Measurement System, is being considered. This consolidation of NPIC's human and physical ADP resources into a single management entity will, we hope, be a significant contribution to NPIC's ability to maintain its leadership in the development and implementation of the most effective and efficient data processing techniques used in the photo intelligence community.

5. During the quarter a major milestone in the development of the Photo-Measurement System was reached with the implementation of a first-phase remote station capability. The Houston-Fearless Dual-Screen Measuring projector was connected on-line and is now in daily use. X-Y measurements to the nearest micron are transmitted to the computer by the push of a button; ground distances and azimuths are printed out on adjacent teletype almost instantaneously. When reliable vehicle attitude data are

available accuracies of measurements made over known distances have been within one percent. Following this initial establishment of a remote capability, and pending delivery of additional on-line measuring equipment, teletypes have been connected in the National and CIA Departmental areas so that PI's may type in measurements from conventional equipment and obtain computed distances.

6. Several significant batch programs in support of the Photo-Measurement System and Photographic Evaluation Studies have been completed. Data derived from horizon images can now be reduced and smoothed to determine and plot the pitch and roll of KH-4 vehicles, saving countless hours of hand computation and plotting. Programs to compute and plot KH-7 film speeds have been placed in operation saving from 200 to 300 manhours per mission.

7. Turning to information retrieval and report generation activities most significant has been the establishment of the "Automated Reporting Subcommittee" of the Photo Interpretation Production Board. This group, composed of representatives of all NPIC components concerned with ADP generation of reports, meets regularly to develop and coordinate new or refined procedures and systems. The first major revision to established procedure completed by the subcommittee involves the use of IBM 826 Document Producing Card Punches in the production of OAK, IPIR, and MCI reports. The 826 machine will be used to create both a typewritten copy and punched cards of PI readouts where previously only typed copy was produced. Although the punched cards will be generated prior to final editing and sign off of the individual write-ups and consequently the number of corrections required will increase, new programs are being completed to permit keypunching only material to be altered vice the entire line or paragraph containing a correction. Another part of the system will permit automatic adjustment of line lengths. Initial trials indicate the new system will save approximately 30 percent of the manhours spent typing, keypunching, and correcting OAK, IPIR, and MCI reports.

8. During the quarter, existing procedures and programs were adapted and new programs written to accomodate several high priority requirements. The techniques developed for indexing the Vietnamese Strategic Hamlet (VISH) sheets and for compiling traffic data on Vietnamese and Laotian roads were applied to AAA studies and military order-of-battle (MILOB) studies.

9. Minicard activity continued to expand. A new file containing AMS produced mosaics of KH-4 photography at a scale of 1:1,000,000 over-laid on WAC charts has been established. A requestor may retrieve those chips pertaining to a specific area, determine by inspection the cloud coverage of the target area, the quality of the photography, the mission, camera, pass, and frame number of pertinent photography and the number of

SUBJECT: Initial NPIC Quarterly Report to Project 375

the film can containing it. This file is far more efficient than the conventional plot books and has been made available to other PI users.

10. NPIC participated with DIA and SAC in two meetings concerning DIA/SAC standardizations and expansion of their Minicard facilities. Both organizations are upgrading their equipment and purchasing additional equipment. It appears that their investments will exceed $500,000 each during the next year. We have evaluated their plans and find them not essential to our present needs. In fact, much of what they hope to accomplish with new equipment we are already preparing to do on our computers. We propose to test the relative costs and effectiveness of electronic computer searching vs. the Minicards electro-mechanical searching before investing any major sums in new Minicard capabilities as we believe investment in the former will be the more economical and rewarding. In the interim, we are making comparatively inexpensive refinements to the system to enable us to keep up with the increasing volume. For example, we have installed a PAKO continuous roll print processor to replace the slow and inadequate Photostat Expeditors which were originally supplied as part of the Minicard enlargers. DIA, and probably SAC, is following suit. We are considering various means of speeding up the type-out of codes on retrieval chips - - the Friden typewriters reduce the present reading speed of the Duplicators by 90 percent. We have also started an active exchange of Minicards with SAC: they have sent us 23,000 UPIR chips on communist China; we have sent them 93,000 chips containing our entire file of [redacted] reports. 50X1

11. Two factors are seriously impeding and frustrating our efforts to get on with our task of developing data handling techniques second to none in the PI community. Most serious is the difficulty of recruiting qualified programmers. Competition with industry is such that few are willing to wait out the time required for security clearances. Even with the scientific pay scale we have difficulty competing with industrial salaries. Philco, recently offered three of our best Univac 490 programmers $1,000 over their current annual salaries to work for them on a NASA contract. Equally frustrating has been the delays inherent in getting building modifications to accomodate new equipment completed by GSA. The PAKO processor for Minicard was ordered in March, delivered in June but could not be installed until the end of July. GSA did not even begin the necessary plumbing and electrical modifications until after it was delivered, even though they had all been specified with the orders. A high speed, high precision plotter has been ready for shipment since June. At last we have been assured that the necessary utilities will be ready by 1 December. We still have no estimate of when we will be able to collocate the IBM 1401 with the Univac 490 even though this was requested last May.

[redacted] 50X1

Chief, Information Processing Division